



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/766,512	01/27/2004	Ares J. Rosakis	06618/929001/CIT 4030	2208
20985	7590	07/26/2007	EXAMINER	
FISH & RICHARDSON, PC P.O. BOX 1022 MINNEAPOLIS, MN 55440-1022			JARRETT, RYAN A	
ART UNIT		PAPER NUMBER		
2125				
MAIL DATE		DELIVERY MODE		
07/26/2007		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)
	10/766,512	ROSAKIS ET AL.
	Examiner	Art Unit
	Ryan A. Jarrett	2125

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 02 February 2007 and 14 May 2007.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above claim(s) 1-6,8-16,18,21-26 and 28-31 is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 7,17,19,20 and 27 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 02 February 2007 is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO/SB/08)
 Paper No(s)/Mail Date _____.
- 4) Interview Summary (PTO-413)
 Paper No(s)/Mail Date. _____.
- 5) Notice of Informal Patent Application
- 6) Other: _____.

DETAILED ACTION

Priority

Applicant's claim for the benefit of a prior-filed application under 35 U.S.C. 119(e) is acknowledged. It is noted however that the Examiner has not yet fully evaluated the provisional Application to determine the level of support it provides for the instant claims, as it is not considered necessary at this time.

Drawings

The drawings are objected to because Figs. 1A, 1B, 2, and 5-11 include dark shading that makes it difficult to discern reference characters contained within the dark shading. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New

Art Unit: 2125

Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 7, 17, 19, 20, and 27 are rejected under 35 U.S.C. 102(b) as being anticipated by WO 01/82335 A2. For example, WO 01/82335 A2 discloses:

7. A method for fabricating a layered structure on a substrate, comprising:

processing a substrate to form at least one dielectric layer on the substrate and parallel line features embedded in the dielectric layer (e.g., Figs. 8A,8B);
obtaining local curvature information in an area of a line feature (e.g., Fig. 1 #102: “Optical Detection Module”, Fig. 1 #106: Curvature Signal”);

obtaining local temperature information in the area of the line feature (e.g., pg. 37 lines 1-4, pg. 38 lines 11-12); and

using analytical expressions to compute local stresses (e.g., Fig. 1: “Stress Data”) in the line feature from a first contribution based on the local curvature information (e.g., pg. 20 Equation (1), pg. 30 Equations (5)-(10), pg. 32 line 21 – pg. 33 line 1) and a second, separate contribution based on the local temperature information (e.g., Equations (13), (14), and (16)), wherein the analytical expressions include geometry information of the line feature (e.g., Fig. 8A: “b”), the dielectric layer (e.g., Fig. 8B: “t”), and the substrate (e.g., Fig. 8B: “h”), and material information of the line feature (e.g., Fig. 8A: “Cu line: E_1, α_1 ”), the

dielectric layer (e.g., Fig. 8A: “ SiO_2 : E_0, α_0 ”) **and the substrate** (e.g., Fig. 8A: “ Si substrate: E_s, ν_s, α_s ”).

17. The method as in claim 7, further comprising:

computing a critical value for a change in curvature according to a failure criterion of the layered structure by using the analytical expressions (e.g., pg. 33 lines 4-15: “Hence, when the difference either along or cross the line exceeds the acceptable level, the liability or performance of device may be considered as being unacceptable”, EN: *The “acceptable level” of curvature “difference” corresponds to the claimed “critical value for a change in curvature”*); and

controlling a condition during fabrication to make a change in curvature to be away from the critical value (e.g., pg. 33 line 22 – pg. 34 line 1: “Hence, one or more aspects of the fabrication or the design of the devices may be examined and modified to reduce the residual stresses within the acceptable range”).

19. The method as in claim 7, further comprising adjusting a processing condition according to the computed local stresses (e.g., pg. 17 lines 1-4).

20. A system, comprising:

a substrate holder to hold a substrate (e.g., Fig. 1 #130: “*Sample Substrate*”) **fabricated with a dielectric layer and parallel line features embedded in the dielectric layer** (e.g., Figs. 8A,8B);

a sensing module (e.g., Fig. 1 #102: “*Optical Detection Module*”) **to interact with the substrate to obtain information about a temperature** (e.g., pg. 37 lines 1-4, pg. 38 lines 11-

12) and curvatures (e.g., Fig. 1 #106: Curvature Signal") of a line feature on the substrate; and

a processing module (e.g., Fig. 1 #105: "Processing Module") programmed with analytical expressions to compute local stresses (e.g., Fig. 1: "Stress Data") in the line feature from a first contribution based on local curvature information in an area having the line feature (e.g., pg. 20 Equation (1), pg. 30 Equations (5)-(10), pg. 32 line 21 – pg. 33 line 1) and from a second, separate contribution from local temperature information of the area having the line feature (e.g., Equations (13), (14), and (16)), wherein the analytical expressions include geometry information of the line feature (e.g., Fig. 8A: "b"), the dielectric layer (e.g., Fig. 8B: "t"), and the substrate (e.g., Fig. 8B: "h"), and material information of the line feature (e.g., Fig. 8A: "Cu line: E_1, α_1 "), the dielectric layer (e.g., Fig. 8A: "SiO₂: E_0, α_0 ") and the substrate (e.g., Fig. 8A: "Si substrate: E_s, ν_s, α_s ").

27. A method, comprising:

providing a layered structure (e.g., Fig. 1 #130: "Sample Substrate") which comprises a plurality of layers stacked over one another, wherein each layer has embedded line features (e.g., Figs. 8A,8B);

optically obtaining information on a surface of the layered structure (e.g., Fig. 1 #102: "Optical Detection Module");

processing the optically obtained information to extract curvature information of the surface (e.g., Fig. 1 #106: Curvature Signal"); and

applying analytical expressions to compute local stresses (e.g., Fig. 1: "Stress Data") in a line feature from a first contribution based on extracted curvature information for an

area having the line feature (e.g., pg. 20 Equation (1), pg. 30 Equations (5)-(10), pg. 32 line 21 – pg. 33 line 1) **and from a second, separate contribution based on a local temperature at a location of the line feature** (e.g., Equations (13), (14), and (16)).

Response to Arguments

Applicant's arguments, see pages 11-12, filed 05/14/07, with respect to the rejection of claims 7, 17, 19, 20, 26, and 27 under 35 U.S.C. 101 have been fully considered and are persuasive. The rejection of claims 7, 17, 19, 20, 26, and 27 under 35 U.S.C. 101 has been withdrawn.

Applicant's arguments, see pages 12-15, filed 05/14/07 have been fully considered but they are not persuasive. WO 01/82335 A2 discloses computing local stresses in a line feature from a first contribution based on local curvature information (e.g., Equation (1)) and from a second contribution based on local temperature information (e.g., Equation (16)). Examiner duly notes Applicant's comments on the differences between the temperature change delta T on page 30 and the yield temperature on pages 37 and 38, and appreciates the differences in the two temperatures. However, Examiner is relying on the yield temperature for the claimed "second contribution", not the temperature change delta T.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ryan A. Jarrett whose telephone number is (571) 272-3742. The examiner can normally be reached on 10:00-6:30 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo Picard can be reached on (571) 272-3749. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2125

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Ryan A. Jarrett
Examiner
Art Unit 2125

Ryan

07/20/07